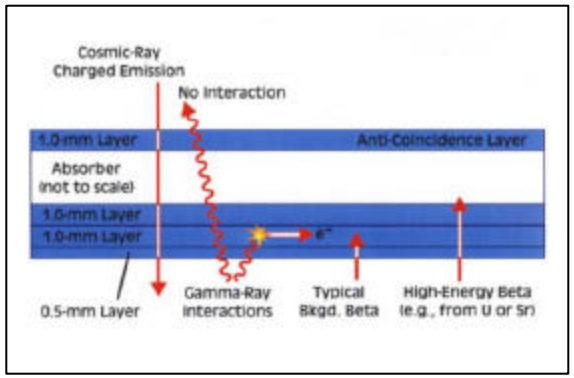
BetaScint™ Fiber-Optic Sensor for Detecting Strontium-90 and Uranium-238 in Soil (TechID 70)

The BetaScint™ sensor is designed to measure beta emissions from Sr-90 and U-238 in soils. The sensor is 150x35x8cm; it can measure contamination of the soil surface or of a soil sample spread over a tray. The time required is 20 minutes per sample at a cost of $30-55, compared with 1-4 weeks and $150-275 for laboratory analyses. The BetaScint ™ sensor works as follows: (1) beta particles (electrons) emitted by radioactive soil contaminants excite electrons in fluorescent compounds doped into plastic fibers in the layers of the sensor; (2) these give off light (scintillate) when the fluorescent molecules lose energy and return to their ground state; (3) scintillations are counted by photodetectors to determine beta radioactivity of the soil sample. Sample processing is limited to drying and sieving soil samples to remove rocks and excessive organic matter. The BetaScint™ system is easy to operate and does not generate secondary wastes.



Developers:

- Pacific Northwest National Laboratory
- BetaScint, Inc.

Applications:

- Monitoring progress of removal of Sr-90 and Ra-226 (paired with gamma sensor) contaminated soils at U. Cal. Davis LEHR (1999).
- Characterizing 14-acre sewage lagoon at ITRI, Kirtland AFB (1995).
- Being deployed in support of BNL BGRR decommissioning project (2000).

Benefits:

- Cost savings of 60%-90% per sample.
- Near-real-time analyses, compared with 1-5 weeks for off-site laboratory analyses.
- Avoidance of costs associated with unnecessary excavation of uncontaminated soils.
- Avoidance of secondary waste generation.

Status:

- Commercially available; contact BetaScint , Inc. (www.betascint.com).
- Underwater version (BetaSonde™) currently under development in collaboration with Woods Hole Oceanographic Institute.
- Innovative Technology Summary Report Available (www.cmst.org).